Health Research Methodology

Learning objectives:

At the end of this session, students will be able to:

1. **recognize benefits of engaging medical students in health research.**
2. **define what a 'Health Research' is.**
3. **list the major characteristics of research.**
4. **describe steps of conducting a health research.**
5. **prepare and present a brief summary of a health research proposal.**
6. **describe the main components of a research report.**

Introduction:

Scientific research plays a very important role in our efforts to maintain health and combating diseases. Research helps us create new knowledge and develop proper tools for the use of existing knowledge. Not only does it enable health care providers to diagnose and treat diseases, research also provides evidence for policies and decisions on health and development.

Benefits of Engaging Medical Students in Health Research:

Targeting medical students early in their careers is a long-term strategy for promoting health research in general. Most of the research to date, on the effectiveness of such a strategy, has shown that research experience, as a medical student, is strongly associated with postgraduate research involvement.

Even if the experience of doing research as a student does not lead to a later career in academic medicine, research experience can help improve students' skills in:

- **searching and critically appraising the medical literature.**
- **independent continued learning.**
- **writing research papers.**

What is research?

Research is the systematic collection, analysis and interpretation of data to answer a certain question or solve a problem.

Characteristics of research:

1. It demands a clear statement of the problem.

2. It requires clear objectives and a plan (it is not aimlessly looking for something in order to come across a solution).

3. It builds on existing data, using both positive and negative findings.

4. New data should be *systematically* collected and analyzed to answer the original research objectives.

Steps of conducting a health research:

A. Prioritizing and selecting a research topic

B. Review of literature and other existing information

C. Development of a research proposal

D. Implementation of study:

i. Data collection
ii. Data processing and analysis
iii. Interpretation of results
iv. Final report writing
v. Presenting the results: Scientific publication, presentation at meetings, seminars, workshops or conferences, and presentation for administrators and policy-makers

A. Prioritizing and selecting a research topic

Criteria for selecting a research topic:

1. Relevance: The topic you choose should be a priority problem. Questions to be asked include: How large or widespread is the problem? Who is affected? How severe is the problem?

2. Avoidance of duplication: Before you decide to carry out a study, it is important that you find out whether the suggested topic has been investigated before, either within the proposed study area or in another area with similar conditions. If the topic has been researched, the results should be reviewed to explore whether major questions that deserve further investigation remain unanswered. If not, another topic should be chosen.

B. Literature review

Why is it important to review already available information when preparing for a research?

- **It prevents you from duplicating work that has been done before.**
- **It helps you to find out what others have learned and reported on the problem you want to study. This may assist you in refining your statement of the problem.**
- **It helps you to become more familiar with the various research methods that might be used in your study.**
- **It should provide you with convincing arguments for why your particular research project is needed.**

C. Development of a research proposal

Contents

I. Title of the research
II. Introduction: Background information and Statement of the research problem (Scientific justification for the study)
III. Research objectives
IV. Research hypothesis
V. Methodology
VI. Work plan
VII. Plan for utilization and dissemination of research results
VIII. References
IX. Annexes

I. Title of the research

- **A good title should be short, accurate, and concise.**

- **It should make the central objectives of the study clear to the reader.**

- **It is important to specify what population will be investigated, and where it will be conducted.**

II. Introduction (Background information and Statement of the research problem)

This section should convince the reader of the relevance of the study (magnitude, severity of the problem). It should provide enough background data for an outsider to understand the different aspects of the problem, or the different factors influencing the problem and the context in which it occurs. Your review of available literature and reports should further illustrate why the problem is important, not only in your own working area but probably also beyond.

III. Research objectives

Research objectives are the goal to be achieved by a research.

- Why should research objectives be developed?

The formulation of objectives will help you to:

1. Focus the study (narrowing it down to essentials)

2. Avoid the collection of data which are not strictly necessary for understanding and solving the problem you have identified

3. Organize the study in clearly defined parts or phases

- Properly formulated, specific objectives will facilitate the development of your research methodology and will help to orient the collection, analysis, interpretation and utilization of data.

- How should you state your objectives?

IV. Research hypothesis

A hypothesis can be defined as a prediction or explanation of the relationship between one or more independent variables (PREDISPOSING/RISK FACTORS) and one dependent variable (OUTCOME/CONDITION/DISEASE)). A hypothesis, in other words, translates the problem statement into a precise, clear prediction of expected outcomes. It must be emphasized that hypotheses are not meant to be haphazard guesses, but should reflect the depth of knowledge, imagination and experience of the investigator. Therefore, in the process of formulating hypotheses, all variables relevant to the study should be identified.

V. Methodology

This section summarizes the most important points of the research design including:

- **Variables:** It is necessary to identify the variables that will be involved in the research project being designed. Four types of variable are important in research: Independent (predisposing/risk factors), Dependent (outcome/condition/disease), Confounding, and Background variables. It is also necessary to specify whether these variables are Numerical (continuous/discrete), or Categorical (ordinal/nominal). Operational definition of different study variables should be clearly phrased.

VI. Work plan

- A work plan is a schedule that summarizes, in a clear fashion, various components of a research project and how they fit together.

- It should include:

1. **The various tasks to be performed**
2. **When the tasks will be performed**
3. **Who will perform the tasks**

VII. Plan for utilization and dissemination of research results

- The proposal should indicate what reports or other means of disseminating research findings are planned.

- Any or all of the following are appropriate for disseminating the results of the study:

⇒ Progress reports

⇒ Final report

⇒ Publications

⇒ Seminars, workshops, and conferences

⇒ Discussion with policymakers and program managers

VIII. References

The references in your text can be numbered in the sequence in which they appear in the report and then listed in this order in the list of references (Vancouver system).

Please refer to the 'Reference' section of the final report described below.

IX. Annexes

These may include:
- Interview schedule/ questionnaires (and/or other data collection tools).
- Informed consent form
- Institutional/Ethical approval for the study

D. Final Report Writing

Main components of a research report:

I. Title or cover page
II. Abstract
III. Introduction
IV. Objectives
V. Methodology
VI. Research results (findings)
VII. Discussion
VIII. Conclusions
IX. Recommendations
X. References
XI. Annexes or appendices (data collection tools, tables)

I. TITLE OR COVER PAGE

Cover page includes: research title, names of the authors with their titles and positions, and the institution that is publishing the report.

The research title could consist of a challenging statement or question, followed by an informative subtitle covering the content of the study and indicating the area where the study was implemented.

II. ABSTRACT (SUMMARY)

The abstract/summary should be written only *after* the final draft of the report has been completed.

It should contain:
- a very brief description of the problem (WHAT)
- the main objectives (WHY)
- the place of study (WHERE)
- the type of study and methods used (HOW)
- major findings and conclusions
- the major recommendations

III. INTRODUCTION

It should certainly contain some relevant background data related to the problem, then the statement of the problem should follow. It should contain a paragraph on what you hoped to achieve with the results of the study.

Note: Be selective, remembering that this section serves to justify your study, not to display your ability to read literature.

IV. RESEARCH OBJECTIVES

The general and specific objectives should be included as stated in the proposal.

If necessary, you can adjust them slightly for style and sequence. However, you should not change their basic nature.

If you have not been able to meet some of the objectives, this should be stated in the methodology section and in the discussion of the findings.

V. METHODOLOGY

The methodology you followed for the collection of your data should be described in detail.

The methodology section should include a description of:

⇒ the study type

⇒ major study variables on which data was collected

⇒ the study population, sampling method and the size of the sample

⇒ data-collection techniques used

⇒ how the data was collected and by whom

⇒ procedures used for data analysis, including statistical tests (if applicable)

VI. RESEARCH RESULTS (FINDINGS)

- The systematic presentation of your findings in relation to the research objectives is the crucial part of your report.

- A description of the findings may be complemented by a limited number of tables or graphs that summarize the findings.

VII. DISCUSSION

- The findings can now be discussed by objective or by cluster of related variables.

- The discussion may include findings from other related studies that support or contradict your own.

- It is important to present and discuss the limitations of the study.

- Some general conclusions may be included as well.

VIII. CONCLUSIONS

- The conclusions should follow logically from the discussion of the findings.

- As the discussion will follow the sequence in which the findings have been presented (which in turn depends on your objectives) the conclusions should logically follow the same order.

IX. RECOMMENDATIONS

- The recommendations should follow logically from the discussion of the findings.
- Recommendations may be summarized according to the groups towards which they are directed, for example:
⇒ policy-makers
⇒ health and health-related managers at different levels
⇒ health and health-related staff who could implement the activities
⇒ potential clients
⇒ the community at large

X. REFERENCES

-References should be written in 'Vancouver style'.

-Citing References

1. Number references consecutively throughout the body of the text in the order in which they are first mentioned.

2. DO NOT include references in your abstract. Identify references in text, tables and legends by numerals in parenthesis e.g. (1), (2,3) or (3-6).

3. Some journals require references to be indicated in superscript which makes typing more difficult.

4. DO NOT use abstracts as your source of information, you must consult the full text of the article before using it as a cited reference.

XI. ANNEXES OR APPENDICES

- The annexes should contain any additional information needed to enable professionals to follow your research procedures and data analysis.

- Examples of information that can be presented in annexes are:
⇒ Tables referred to in the text but not included in order to keep the report short.
⇒ Interview schedule/ questionnaires (and/or other data collection tools).